Northern White-Cedar

(*Thuja occidentalis*)

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Northern white-cedar, also commonly known as arborvitae, grows naturally in the southeastern part of Canada and the northeastern part of the United States. It is a slow-growing tree of medium size. Many varieties of northern white-cedar have been produced in nurseries, and it is widely planted for ornamental purposes, both in this country and abroad. The tree is usually found along the banks of streams and in swamps where it sometimes forms nearly impenetrable thickets. It reproduces readily and grows under a considerable range of conditions. Severe cutting, especially in the Lake States, has markedly reduced the stand. The future of northern white-cedar is dependent largely on whether or not the northern swamps and other locations where the tree grows are allowed to remain in a condition favorable to reproduction.

The most valuable properties of the wood of northern white-cedar are its durability, light weight, ease of working, small shrinkage, and freedom from warping. The chief uses of the wood are for poles, ties, and posts where durability is particularly desirable. Of the small amount of lumber produced, much of the better quality material is used in the manufacture of tanks and small boats.

Nomenclature.—Northern white-cedar is frequently called arborvitae. Other names sometimes used are white cedar, swamp cedar, or simply cedar.

Distribution and growth.—In the United States, northern white-cedar grows largely in New England and in the northern half of the Lake States. Southward from New England its range narrows and follows the mountains of the eastern United States to North Carolina and eastern Tennessee (fig. 1).

Mature trees generally reach heights of from 25 to 75 feet and diameters of from 1 to 3 feet, depending on the character of soil, amount of moisture, and other conditions. Northern white-cedar grows slowly in swamps and may take 50 to 75 years to reach a diameter of 5 inches and 120 to 160 years to reach a diameter of 12 inches. The crowded stands which northern white-cedar frequently forms in swamps are often so dense that development of the trees is greatly retarded. When such stands are thinned, growth in the remaining trees is much stimulated. The rate of growth in moist but well-drained locations, where

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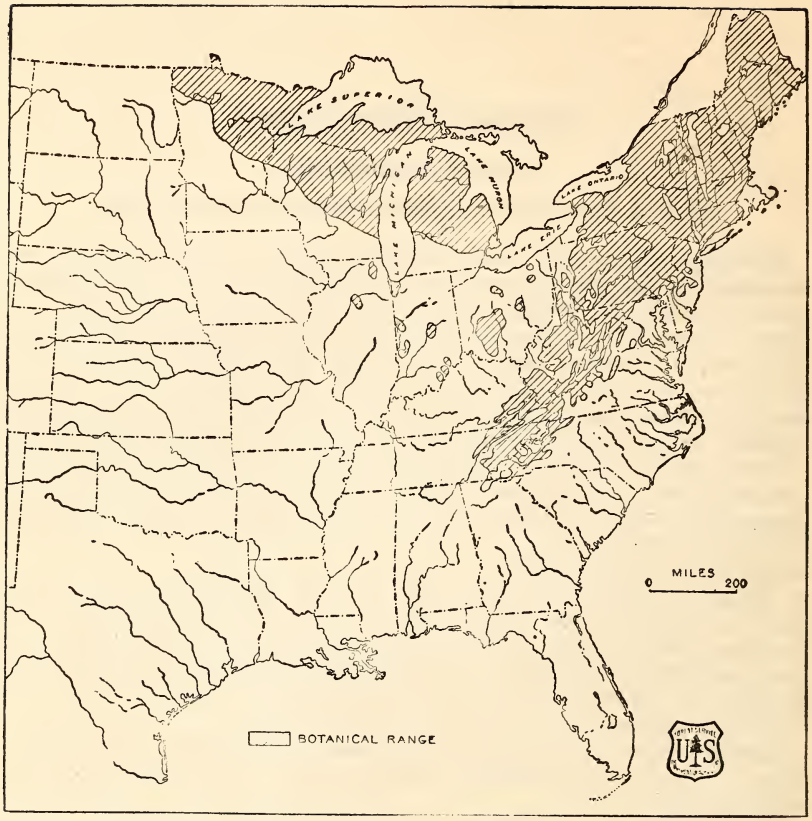

FIGURE 1.—Range of northern white-cedar (*Thuja occidentalis*) in the United States.

the stands are more open, is generally considerably faster than in swamps.

The trunks of the larger trees are frequently fluted and buttressed at the base and are often affected by a rot which causes hollow butts but which apparently ceases to grow after the tree is cut.

The white-tailed deer are particularly fond of northern white-cedar foliage and in the Lake States are largely dependent upon it for food during the winter months. In areas with heavy deer concentrations, browsing on seedlings and young trees is an important limiting factor to the successful establishment of Northern white-cedar stands.

Supply.—A forest survey of the Lake States completed in 1938 [1] included 41,500,000 poles, equivalent roughly to 800,000,000 board feet,[2] and 225,000,000 posts not suitable for saw timber. Saw timber as such was not listed. Over one-half of the pole timber was located in Michigan. Information on which to base an estimate of the stand of north-

[1] CUNNINGHAM, R. N., and MASON, H. C. FOREST AREAS AND TIMBER VOLUMES IN THE LAKE STATES. Lake States Forest Expt. Sta. Econ. Note 10, 10 pp. 1938. [Processed.]

[2] It is assumed that one-half of the poles were of saw-timber size and that these poles had an average lumber content of 40 board feet.

ern white-cedar in the Northeastern States is not available. If the stand in these States has the same ratio to reported lumber production as stand bears to reported production in the Lake States, then the total stand of northern white-cedar saw timber would approximate 1,200,000,000 board feet.

Production.—The amounts of northern white-cedar that were formerly used for poles, ties, lumber, posts, etc., have been markedly reduced in recent years. The number of northern white-cedar poles treated with a preservative during the period 1927 [3]–42 has varied from a maximum of 650,424 poles in 1929 to 119,190 poles in 1942. The average number treated annually for the 10-year period 1933–42 was approximately 160,000 poles. If it is assumed that one-third of the northern white-cedar poles are treated, the total number of these poles used annually in recent years would be approximately 480,000, equivalent to 19,000,000 board feet. Northern white-cedar poles treated in 1943 totaled 123,443.

The production of "cedar" cross ties in the 4 years 1925, 1927, 1929, and 1931 varied from about 3,400,000 in 1925 to less than 1,400,000 in 1931 [4] with an average annual production of about 2,500,000. Probably about one-fourth of these "cedar" ties were northern white-cedar. The annual production of northern white-cedar ties in recent years has undoubtedly decreased and is estimated roughly at 300,000, equivalent to 9,000,000 board feet.[5]

The reported production of northern white-cedar lumber in 1899 was over 95 million board feet. Of this, about 88 million feet was cut in the Lake States and about 7 million feet in Maine. By 1909 the cut had fallen to approximately 41 million board feet, of which the Lake States furnished about 26 million feet and Maine about 15 million feet. In 1929 the cut dropped to 10 million feet, Maine furnishing approximately 6 million feet and the Lake States approximately 4 million feet. In 1942 about 8 million board feet of northern white-cedar lumber was produced, of which over 6 million board feet came from the Lake States [6] and nearly 2 million board feet from Maine. The 1943 total production was somewhat less than 4 million board feet. The average annual production of northern white-cedar lumber for the 10-year period 1933–42 was approximately 7 million board feet. About two-thirds of it came from the Lake States and about one-third from Maine. Posts and shingles in unknown quantities were also produced. The total cut of northern white-cedar for all purposes is estimated roughly as equivalent to 40 million board feet.

Properties.—The heartwood of northern white-cedar is light brown, and the thin sapwood (rarely over 1 inch in width) is white. In texture the wood is fine and uniform. It is very light in weight,[7] soft, weak, lacks stiffness, is low in shock resistance, and splits readily. The wood has a tendency to separate between the annual rings of growth, and the lumber often contains ring shakes which form in the

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[3] The earliest year for which treatment figures are available for northern white-cedar as a separate species in the Proceedings of the American Wood-Preservers' Association.

[4] A year of business depression and the last year for which production statistics on ties are available.

[5] An average tie is estimated to contain 30 board feet.

[6] This is the largest cut of northern white-cedar lumber in the Lake States since 1912.

[7] The average weight of air-dry northern white-cedar (12 percent moisture) is 22 pounds per cubic foot.

standing tree. Northern white-cedar has the characteristic pleasant, aromatic odor of the cedars, shrinks very little in drying, stays in place well, is easily worked, holds paint well, and is ranked among the species with the highest resistance to decay.[8] The heartwood is difficult to penetrate with a preservative, but the narrow sapwood can be readily treated.

Principal uses.—Northern white-cedar is used principally for poles, ties, lumber, and posts. The durability of the wood fits it especially for use in contact with the ground or in other situations favorable to decay. A considerable proportion of northern white-cedar poles are butt-treated with a preservative before being put into service to increase the durability of the sapwood. The method generally used is to stand the poles upright in tanks containing hot creosote long enough for the sapwood to become at least partially impregnated with the hot oil. The butts of the poles are treated for a sufficient length so that when a pole has been set in place in the ground the treated portion will extend about 18 inches above the ground line.

The logs are often knotty, crooked, or hollow, and much waste occurs in sawing northern white-cedar into lumber. The better quality of the small amount of lumber manufactured is used principally for building construction in places where a high degree of durability is needed and for tanks, boats, and woodenware. The low-grade material goes largely into shipping containers. Small quantities are used for fish-net floats and for making imitation minnows used in fishing. Northern white-cedar is also used in limited quantities for pails and tubs and for shingles. A variety of cedar-leaf oil is distilled from a mixture of the leaves of eastern red-cedar and northern white-cedar. This oil has a limited use in medicine.

In a census of the quantity of wood used in 1940 in the manufacture of various wooden products, northern white-cedar and Atlantic white-cedar were grouped together as "eastern white cedar." The combined consumption of these two woods was reported as 7,733,000 board feet. Of this, northern white-cedar probably furnished about 5,000,000 board feet—largely in the form of lumber with a small proportion of short logs and bolts. The amounts used in manufacturing various products were in round numbers as follows: Shipping containers—1,900,000 board feet; sash, doors, and other millwork—1,500,000 board feet; tanks—900,000 board feet; small boats—370,000 board feet; woodenware—340,000 board feet; and sporting goods—10,000 board feet.

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[8] Refers to heartwood. The sapwood of all species lacks durability.

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